Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

"the very butchers of *a silk* button," adopt this solution as a just one, and pass on to the next object, as though the point had been completely settled.

Suppose a traveller, who relied on this solution, and had it full on his mind, approaching the shore in the vicinity of Pharos, what kind of coast *must* he expect to meet? Certainly a coast of alluvial land, not very much above the inundating level. The striking feature of the shore, and of the country for (we may calculate,) about 70 miles inland, would be the same depth and richness of soil, as in the greater part of the Delta at present. Rocks he could not expect to find. What does he actually find on his landing?—A dangerous rocky shore; the very kind of shore which might be expected to remain after the sea had worn the land, and till its further depredations had been resisted by the rocky ridge, to which it had eaten its way. In this we see, not only that the solution by the Scholiast is unfounded, but that the reverse is actually established by the present appearance of the coast.

The opinion of Strabo is rather more in consistency with common sense. His words are to the following purpose: "It may be naturally supposed, that Homer had heard of the rising and increase of land by accretion; from which concluding, that the island had been more distant from the main land in earlier times, than in the time of Menelaus, he intentionally described the distance as many fold greater, for the sake of the fabulous"—to add to the interest of the tale.

OMICRON.

For the Belfast Monthly Magazine.

ON THE POISON OF COPPER.

(Extracted from Essays addressed to the Heads of Families; by A. Fothergill, M.D. F.R.S.)

Unde fames homini vetitorûm tanta ciborûm?
Audetis vesci, genus ô mortale! quod oro,
Ne facite; & monitis animos advertite nostris!

Ovid Metam. xv. 138.

COPPER, in consequence of its ductility and splendor, is well adapted to various purposes in metallurgy; but it is no less remarkable for its solubility. It is liable to be acted upon by almost all saline and metallic substances. It readily dissolves not only in every acid, but also in alkalies both fixed and volatile, in neutral saline liquors, and even in vegetable oils and animal fats, in consequence of the latent acid which they contain.

Copper, when rubbed with a warm hand, yields an unpleasant odour, and, when applied to the tongue, a nauseous taste. Exposed to a moist air, it contracts a greenish rust; even pure water suffered to stand long in copper vessels, contracts a coppery taste, and unwholesome quality.

It is very remarkable, that water becomes more strongly impregnated with the metal on standing in the cold, than if boiled in the vessel for a much longer space. The same is said to take place in regard to vegetable acids. Hence the confectioners venture to prepare the acid syrups even of orange and lemon juice in copper vessels. These acid preparations, according to *Dr. Lewis*, acquire no ill taste from the metal while kept in a boiling heat, whereas, if kept cold in such vessels, they soon become impregnated with the disagreeable taste and pernicious qualities of the copper. But the mere taste is by no means a satisfactory test, because a very slight impregnation of copper may be so far disguised by the acid and sugar as to elude the taste, and yet prove injurious to the nervous system. Mineral acids are acknowledged to act more powerfully on this metal when aided by heat; and admitting that the action of vegetable acids is on the contrary weakened by heat, yet we have no proof that it is thereby wholly destroyed.

Copper with the vitriolic acid yields vitriolate copper, or blue vitriol;—with the vegetable acid, verdigris;—with volatile alkali, tincture of copper; with sal ammoniac, ammoniacal copper. These are the principal preparations of copper that are now in use for medicinal purposes: they act as powerful tonics, sedatives, and astringents, and become useful remedies, or virulent poisons, according as they are managed. Externally they are employed as escharotics for deterging foul ulcers, and disposing them to heal. Internally they are sometimes given in hysteric, epileptic, intermittent, and other nervous diseases, but ought never to be administered without the utmost caution. Verdigris being the most intractable of the whole class, has long been confined to external use, except for the purpose of expelling arsenic and other fatal poisons. It is generally rejected the moment it comes in contact with the stomach, and is perhaps one of the most instantaneous emetics in nature; but as it operates with great vehemence, it perhaps ought not to be hazarded even in these cases, especially when the inflammation may be supposed to have already made a considerable progress.

Preparations of copper are highly esteemed in the arts, for the beautiful blues and vivid greens which they communicate to various substances, and are therefore frequently employed in painting in oil and water-colours, in colouring glass, and in enamelling. Even the ores of this metal exhibit a variety of exquisite colours, blue, red, green, yellow, variegated like the rainbow, or peacock's tail. The lapis lazuli, from which the precious blue pigment termed *ultramarine* is prepared, is no other than an elegant ore of copper. To this, the jasper and the sapphire also owe their beautiful tinge. Ores of this metal are found in most parts of the world; but when they happen to be mixed with iron, the copper cannot be separated to advantage by any method yet discovered; hence some rich copper-mines, on this account, remain unworked.

Copper is sometimes, though very rarely, present in waters under the form of vitriolated copper in solution. Such is the celebrated water of Wicklow in Ireland, which yields a considerable quantity of copper, by a very simple process. Iron bars are immersed in the water, and after some time are found covered with a rich coat of copper.* This instance of chemical attraction has imposed on some persons so far as to be considered as an actual transmutation of iron into copper, but is in fact a mere precipitation.

Copper readily unites with other

---

* A spring of this kind is also lately found near Berkley in Somersetshire, which I had an opportunity of examining. The water imparts to polished iron a coppery appearance, has a nauseous styptic taste, and is powerfully emetic. The family, finding it unfit for use, have had recourse to a neighbouring spring, which, however, probably partakes in some degree of the same quality. Be this as it may, several of the family have at different times been attacked with severe epileptic fits, as they assured me on my visit to one of the brothers then labouring under that disease.

metallic substances, and affords various compound metals.

Thus copper with about 1-4th part of zinc, forms brass.

———— with 1-10th of tin—bell-metal.

———— with 1-8th of arsenic—white copper.

It is moreover the basis of bronze, specula, Bath-metal, Princes-metal, and all the yellow compounds prepared in imitation of gold. Even silver receives an alloy from copper, before it can acquire a proper degree of hardness for plate.

Brass is less disposed to contract rust than copper, and bell-metal than brass; white copper least of all; but the arsenic in its composition alone renders it totally unfit for culinary use. If acid liquors are suffered to stand a few hours in any vessel containing a mixture of copper, they acquire a bad taste, and consequently a slight impregnation of the metal. Nor are silver vessels wholly exempt from this inconvenience, especially such as are considerably alloyed with copper.

When the poison of copper is accidentally received into the body, unless it be immediately expelled, it produces the most formidable symptoms, as enormous vomitings, profuse discharges of bile, inflammations, and erosions of the stomach and bowels, delirium, convulsions, syncope, and death. Nay, even the handling of this poison in the form of verdigris, or a composition containing it, has in certain irritable habits been known to occasion very disagreeable effects.[*] The manufacturers of verdigris, and those who grind it for paint, or use it in oil or water-colours, seldom fail to experience its noxious influence on the organs of respiration, or digestion.

"I have known," says an eminent Professor of chemistry, "vehement vomitings and convulsions in children from the *Unguentum Ægyptiacum,* (whose basis is verdigris) injudiciously applied to ulcers in the mouth;[‡] likewise a person, who, accidentally having swallowed a brass sleeve-button, was seized with violent symptoms, and died in misery, no medicines giving relief."

It is extremely unpleasant to reflect on the dangers to which we are so often exposed by the use of copper vessels for preparing various foods. This consideration has indeed induced some discreet families to discard this dangerous metal from all culinary processes. But though verdigris is one of the most violent poisons in nature, yet the greater part of mankind, rather than abandon an old custom, are content to swallow a portion of this poison every day! Accordingly, vessels of copper, brass, or bell-metal, are still permitted to supply their respective quota of this deleterious substance to imbue our several viands. Having, through long usage, obtained a quiet settlement amongst us, they now claim, as it were, a prescriptive right to assist at all culinary operations—a claim which we seem neither to have inclination or resolution to dispute: for, notwithstanding every remonstrance to the contrary, copper and its compounds continue to disgrace not only our kitchens, dairies, and confectionaries, but also the breweries, distilleries, laboratories, and even shops of the apothecaries. The very air of these places abounding with acid, oleaginous, and saline particles, penetrates and disposes them to dissolution, even before they are used. The mildest fluids, such as milk, whey, or even plain water, left to stand in open copper vessels, receive an impregnation of the metal, discoverable by the volatile alkali. But it is remarkable that the corrosion always begins at the surface, in contact with the air, and is distinguishable by leaving a greenish ring. Such is the power of the air in promoting the action of the menstruum. On this principle, perhaps, may be explained why acid vapours act more powerfully on lead and copper than the acids themselves, converting the former more speedily into ceruss, the latter into verdigris.

---

[*] See the extraordinary case of Mr. Butler of Moscow, as recorded by Dr. Mounsey. Among other symptoms, severe itching, and burning pungent pain darting through the limbs like electricity. *Phil. Trans. vol.* 50, *art.* 2*d. and Sequel, vol.* 54, *art.* 2*d.*

[‡] Newman's Chemical Works, vol. 1, p. 98.

People generally imagine that the ill effects of copper are entirely prevented by its being tinned, and therefore without hesitation commit to such vessels acid soups, vinegar, lemon-juice, apple-sauce, greens, butter, and other articles equally exceptionable, where they are sometimes suffered to remain a considerable time without any suspicion of danger. But the tin which lines the copper is so extremely thin that it is soon abraded, or even penetrated by the verdigris, which insinuates itself through the pores of the metal, and at length betrays itself by a green efflorescence on the surface. Add to this, the tin is generally alloyed with a considerable proportion of *lead*, besides an additional quantity contained in the solder.

Examples are indeed too frequent of fatal consequences from foods that had received a taint from copper vessels, whether from the food being of an acid nature so as to corrode or dissolve a portion of the metal, or from the vessel having contracted a soluble rust or verdigris, by exposure to the air, or being badly tinned. The affecting incident of this kind, which happened some years ago to several gentlemen at an entertainment at Salt-hill, is still within our remembrance. Though it was then generally attributed to adulterated wine, it was at length brought to light by the confession of the cook, who acknowledged just before her death, that it was wholly owing to the poison of copper, in consequence of her own carelessness, and which, through fear of punishment, she had been induced till then to conceal.

On dipping into some of our best systems of modern cookery, which have undergone several editions, I am sorry to find, amidst the numerous corrections and improvements, so much room still left for amendment, and so much serious cause for animadversion. Nor is this to be wondered at. The culinary art depends almost entirely on chemical principles, and every professed cook may in some measure, be considered as a practical chemist; and the kitchen, the laboratory wherein are daily performed various chemical processes highly important to health. The principles of chemistry therefore ought to be well understood by those who practice cookery, and particularly by such as undertake to instruct others in the art. But where shall we find cooks competent to the task; or even a single book on the subject that does not betray the author's ignorance, not only of the chemical properties of the various substances, but also of the vessels and apparatus employed? From this cause proceed many dangerous mistakes and inaccuracies. These from time to time are copied by succeeding writers, perhaps equally enlightened as their predecessors, and are thus transmitted through various new impressions. Hence we every where meet with error and inconsistency, blended with instruction; and these pervade all their works.

It is curious to remark, that in the

introductory part of these complete Treatises on Modern Cookery, the reader is generally very gravely admonished against the use of vessels made of copper, brass, and other dangerous materials—that vinegar and salt penetrate common earthenware, and therefore pickles ought to be kept in stone or glass jars. But when arrived at the receipts for pickling and preserving acid fruits, what must be the gentle reader's astonishment to find those very vessels expressly recommended which so lately were absolutely condemned! Thus, in the process for pickling gerkins, or young cucumbers, "the best white-wine *vinegar*, in which they are to be pickled, is ordered to be boiled in a *bell-metal* pot" In a subsequent receipt, "Cucumbers are directed to be pickled in *pewter* dishes with *salt* interposed. Afterwards the vinegar to be poured, from them into a copper saucepan with a little salt." It is added, "they will then be fit to eat in two or three days!"

Lemon pickles are ordered to be done in an *earthen* dish—golden pippins in a *pewter* dish, with *vinegar*, &c.—"To pickle samphire; put it into a *brass* saucepan, throw in a handful of *salt*, and cover it with good *vinegar*, and set it over a slow fire."

Others, with less reserve, recommend *copper* coin to be put into each vessel in which these pickles are kept, because, say they, "it preserves their colour, and gives them a beautiful green."

From eating a quantity of fine pickled samphire thus imbued with copper, an amiable young lady was presently seized with dreadful convulsions, which soon put a period to her life. This melancholy case has been already communicated to the public by my ingenious friend *Dr. Percival* *

If our pickles must absolutely look green to please the eye at the expence of health, or even life, why should our fair authors, who preside over all culinary operations, and consequently over our health and lives, thus mince the matter? Why not steep the pickles at once in a strong solution of verdigris? This surely, on certain occasions, would be a capital improvement, as it would speedily impart to them a more elegant green, together with the entire virtue of the salutary ingredient. By thus rendering them "fit to eat" in two or three hours, instead of as many days, it would dispatch the business with more certainty and greater expedition.

After pickles we are presented with creams; therefore, to crown the banquet, I shall serve up a very curious one by way of desert.

Ratafia Cream.

Take six large laurel-leaves, boil them in a quart of thick cream, adding eggs, sugar, &c.

Whether the subtile poison of the laurel, which this choice receipt exhibits in a very ample dose, is rendered wholly inert by boiling, and by being inviscated with the other ingredients, has not been determined. Or whether it may not still, though in a slight degree, exert a portion of its specific power, similar to that of the celebrated laurel water, must be left to future experience. It comes in such a very doubtful form, that I neither incline to try it myself, nor safely recommend the experiment to others.

The famous clotted cream of Devonshire being commonly prepared in *brass* vessels, bears also a very suspicious cast. It has sometimes been observed to betray a slight metallic taste, and to excite nausea and vomiting.

---

* See Med. Trans. of the Royal College, vol. iii.

If from the kitchen we should dive into the cellar, we shall find that acid vapours are predominant, and that the brass cocks through which our wine, beer, cyder, and vinegar, are drawn, are generally discoloured with verdigris.

In these subterranean abodes, which are often very damp, the green rust is often suffered to accumulate till it overspreads the external surface of the metallic cock, and would also visibly pervade the internal orifice of the canal, were it not successively dissolved by the liquor, and washed off in the general current, as often as the cock is unturned.* That verdigris is soluble, in very considerable proportion, in all these liquors, and therefore capable of impregnating them with the poison of copper, is clearly proved by the following experiments.

		Grains.
1.	Half a pint of rectified Spirit of Wine, digested on half an ounce of Verdigris, (240 grains) dissolved	80
2.	Same quantity of Malt Spirit	90
3.	———————— French Brandy.	150
4.	———————— Water	100
5.	———————— common Wine Vinegar	225
6.	———————— Distilled Vinegar	230
7.	———————— Wine, Beer, and Cyder, dissolved more than Water or Spirit, but less than either of the Vinegars.	

Should we once more revisit the shops, laboratories, and repositories of drugs, we should find that in these places, it requires no less care and attention to guard against the poison of copper, than that of lead. Here all the powerful solvents of copper are assembled; acids, alkalies, neutrals, and oleaginous bodies, stand in array, as it were, to attack this metal, and to disseminate its poison. Their very effluvia render all the copper vessels and utensils extremely prone to contract rust; hence medicines of the most innocent kind unexpectedly acquire a noxious quality. Thus in the distillation of simple waters, in a still of this metal, the last runnings, which are evidently acid, have frequently proved emetic. The same effect has been observed from distilled vinegar, which is indeed less to be wondered at; nor is it surprising that oxymels and acid syrups, prepared in copper vessels, should contract a similar quality. Various other acescent medicines being often evaporated in brass pans, or copper vessels badly tinned, are exposed to the like impregnation, and therefore extremely liable to suspicion, such as the lenitive electuary, cassia, electuary, rob of elder, and most of the vegetable extracts.

Even coral, burnt-hartshorn, crab's-claws, and other insipid testaceous bodies, however improbable it may appear, are not always exempt from this poison; for it has lately been discovered by the ingenious Mr. Blizard, that when these hard substances are triturated in a bell-metal mortar, if the powder be closely examined it will be found to contain particles of the metal separated by abrasion, visible to the naked eye, and further distinguishable by experiments with the volatile alkali.[*] Bell-metal contains a considerable portion of copper, therefore these mortars are not only liable to abrasion, but corrosion, by all the substances that are capable of acting upon copper.

---

* The brass and copper cocks, now in use, being very unsafe, unless kept perfectly clean, which is perhaps impracticable, ought to be wholly discarded. Might not a mixture of tin and bismuth, a composition incapable of being affected by vegetable acids, be properly substituted in their place? or perhaps rather the improved wooden cocks, which would entirely prevent danger, or even suspicion?—The silver tops of cruets, in consequence of the copper contained, are also improper, being blackened and corroded on the inner surface by vinegar, oil, mustard, sugar, &c. Cruets ought therefore to be mounted with ground glass stoppers.

Hence various absorbent, saline, and saponaceous bodies, whether reduced into the form of powders or pills in these mortars, may easily acquire an accidental impregnation of copper.

Brass mortars and utensils are equally subject to the same inconvenience.

Brass and copper scales speedily contract verdigris, from salt and groceries being weighed in them, as appears from the green efflorescence with which we generally see them discoloured.

Of late the British copper-mines have poured forth the ore in such abundance, that this metal begins to usurp the place of lead, and to extend its dominion from the cellar and kitchen to the upper stories, and even to the roofs of our houses; sheet copper being now the fashionable covering of various new buildings. Notwithstanding the lightness, cheapness, and elegance of this new covering, it has certain disadvantages, which seem to have been overlooked.

Being very liable to be corroded by air and watery moisture when thus exposed to the weather, the rain-water descending from such roofs and gutters cannot be very wholesome or eligible for internal use, such water being found poisonous to animals; yet where springs are scarce, the inhabitants are obliged to have recourse to rain-water for all domestic purposes. Nor will the painted coating, consisting of coal pitch, lately proposed for obviating this inconvenience, be likely to succeed, but rather to increase the evil, especially as it contains a manifest acid: and were white lead paint to be used in its stead, the remedy still would be worse than the disease.

Copper, moreover, being a powerful conductor of electricity, might not such a widely-extended surface of insulated metal, aided by iron palisadoes around the parapets, tend to invite the lightning in a severe thunder storm, and accumulate it, so as to shiver the whole building to atoms.

The immense coppers used in Breweries and Distilleries, and other great public undertakings, being generally untinned, are peculiarly subject to corrosion, and therefore demand uncommon attention to cleanliness. In brewhouses, if any portion of wort (be it ever so small) is left to stand in the copper when cold, or longer than absolutely necessary, without being well cleaned out, it not only disposes the whole quantity of the subsequent liquor speedily to turn sour, but, what is worse, impregnates it with the poison of copper, incapable of being corrected by the succeeding fermentation.

The evil is greatly increased by a warm season; hence the frequent complaints of stale beer, particularly in the summer time, among many families. Such liquor within two or three weeks becomes acid, and unfit for use; and if the impregnation of copper is considerable, it proves emetic, and highly pernicious to those who drink it as daily beverage. On the other hand, those brewers who pay close attention to their vessels, and reward their servants for doing the same, prevent this unwholesome impregnation altogether and have the additional satisfaction to find that their beer, instead of being returned on their hands as unsound, remains sweet and entire, even in the hottest summers.

---

[*] See Experiments and Observations on Copper and Bell-metal, 1786.

In dairies *milk* and *whey* are heated in large copper or brass cauldrons untinned; if these acescent fluids are left to stand long, a corrosion of the metal must necessarily ensue, or if they are set by without being carefully cleaned from time to time, they will certainly contract verdigris, being more subject to corrosion than lead.

Butter melted in copper sauce-pans, or those that are badly tinned, is peculiarly liable to acquire the same noxious impregnation, as appears from the nauseous taste of the metal, and the sickness which sometimes succeed the use of such pernicious sauce.

Esculent and acescent vegetables, such as spinage, cabbage, brocoli, and green pease, are generally esteemed at most tables in proportion to the degree of *greenness* which they assume. To heighten the colour, experienced housewives, not ignorant of the efficacy of copper, generally give the preference to such vessels, and to make sure work of it, on certain occasions, even direct that copper halfpence also should be added! Hence, perhaps, the austere metallic taste and nauseating quality which we sometimes, with regret and surprize, experience on partaking of these dainty inviting vegetables.

The water in which tea is infused is commonly boiled in a copper kettle, and a remnant is often left to stand till the day following, and if the tin lining be worn off,* the water acquires an unpleasant taste, which is sometimes ascribed to the badness of the tea, when in fact, it is wholly owing to the vessel. After long use, indeed, the kettle acquires a thick stony incrustation from the earthy particles deposited by the water, which more effectually guards the copper from corrosion; hence an old tea-kettle *(cæteris paribus)* is much safer than a new one. Tea, in its recent state, is said to be dried on hot plates of copper; hence, perhaps, its emetic quality, which however goes off before it arrives in this country. Whether the various nervous symptoms generally attributed to that vegetable, may not sometimes proceed from a metallic impregnation seems at least equivocal.

The abuse of copper vessels is by no means confined to cities, towns, and villages, but extends to camps, fleets, and mercantile ships, where fewer accomodations, and less attention to cleanliness, may be naturally expected. Exclusive of this copper vessels at sea are peculiarly liable to contract verdigris, from the marine acid with which the air is impregnated, to say nothing of the additional causes derived from the nature of the provisions, such as fat pork, and other salted meats, which are daily boiled in them.—"I have myself known (says Mr. Travis) even a small ship's boiler, through neglect of cleaning, become one-eighth of an inch thick of verdigris, which would sometimes separate in large flakes, and mix with the food; when it was no uncommon thing to have the whole crew seized with violent vomiting, &c. But the dose not being repeated long enough, they in general escaped the dreadful effects which attend the use of coppers in large men of war, where the friction is so great, (especially in a rolling sea,) that their coppers, though built as strong as possible; are obliged to be new set almost after every cruise."

---

* So extremely thin is the tin in general, that even in the better sort of coating, it has been computed that half an ounce is made to cover 254 square inches, being only one grain of tin to a square inch. and inferior sorts, considerably less. *Watson's Chemistry, vol.* iv. *p.* 181.

To this metallic poison, chiefly, he endeavours to trace that dreadful scourge, the *Sea Scurvy*. "For," adds he, "the number of ships we send from Scarborough is about 200 sail, and the seamen about 3000. On board of these, *iron-pots* are in general use, and we have no instance of any one having the symptoms, called *highly scorbutic*, except in some few of the larger ships, in which *coppers* are used."*

I shall not here stop to inquire into the validity of this new theory of the scurvy, especially as other causes which prevail at sea, are deemed fully adequate to the effect, as the saltness of provisions, impure air, together with bodily fatigue and watchings, without having recourse to this poison, which in general shows its effects more suddenly, by attacking the bowels and nervous system.

However this may be, it is certain, there have been innumerable instances of the pernicious consequences of eating foods dressed in copper vessels not sufficiently cleaned from this poisonous rust. Mr. Ramsay, and other navy surgeons, have observed many extraordinary cases of madness suddenly appearing among the crew, for which they could assign no other cause but the foulness of the coppers; but upon their remedying that fault, the disease presently stopped.

The author of a tract, entitled, "Serious Reflections on the Dangers attending the use of Copper Vessels," published at London in 1755, asserts, that "the greater frequency of palsies, apoplexies, madness, and all the frightful train of nervous diseases which suddenly attack us, without our being able to account for the cause, or which gradually weaken our faculties, are the poisonous effects of this pernicious metal taken into the body insensibly with our victuals, and thereby intermixed with the animal juices."

From the numerous examples of these alarming maladies, which have appeared since the above period, and *particularly of late*, we may conclude, that the cause (whatever it may be,) still subsists without the smallest diminution. If to the effects of this poison, we add those of lead, and trace back their respective influence in cookery, pharmacy, and the arts, and reflect how often they may thus gain silent admission into our bodies in various foods, as well as medicines, we shall advance still nearer to the truth; and perhaps find sufficient cause for the above conjecture. If so, we shall see but too much reason to exclaim with the sons of the Prophets, (2 Kings, iv., 40.)

"Death is in the Pot."

But even admitting the mystery to be thus solved, and the real cause discovered, it still rests with ourselves to apply the remedy. Moved by considerations of this sort, the Senate of Sweden, about the year 1753, wisely prohibited copper vessels; and expressly ordained, that none but such as were made of iron or tin should be used in their fleets and armies—an example highly worthy the imitation of the British Senate! The Royal College of London have at length done the same, by banishing copper vessels from all chemical and pharmaceutical operations; at least, wherein their danger was apparent.*

---

* London Medical Inquiries, vol. ii. p. 13.

It therefore only remains to be determined, whether we mean to follow such bright examples, or to suffer this pernicious metal, some time longer to disgrace our kitchens, and mingle its rust with our victuals; or, in other words, whether we should not rather exert our authority, and resolve at once to extirpate the cause of the evil, than thus tamely submit to receive a daily portion of poison from our cooks.

For the benefit of those persons who know the value of health, and wish to avoid the dangers that must daily await them, while copper vessels continue to be employed in all culinary processes, I shall add a few remarks on the principal chemical tests, by way of illustration.

1st. The most exquisite test of the presence of copper, is the *Volatile Alkali*, or *Spirit of Sal Ammoniac*. If ten or twelve drops of this spirit be added to any liquor impregnated with copper, it instantly exhibits a blue colour, in proportion to the quantity contained. This elegant experiment has been carried to an almost inconceivable degree of minuteness, by the Honourable Mr. Boyle, so as to afford at once a striking example of the excellence of the test, and the extreme divisibility of this metal.

2dly. Another method is by precipitation with iron. Thus, if a piece of polished iron be immersed some time in any fluid wherein copper is held in solution by the intervention of an acid, the acid having a stronger attraction to iron, lets go the copper to unite with it, and the copper is afterwards found adhering to its surface in its shining coppery form, as has been already mentioned.

3dly. By evaporation of a large quantity of the liquor, and subsequent calcination and reduction, as proposed concerning lead.

Thus may acids, fermented liquors, and various suspected articles of diet, be easily put to the test.

Where clean pellucid liquors are to be examined, the *volatile alkali* alone is quite sufficient; but in all turbid or coloured mixtures, it will be sometimes requisite to have recourse to the several methods successively, by which, it is presumed, the poison cannot easily escape detection.

Practical authors, among whom M. Tissot, Dr. Buchan, and others, who have humanely condescended to instruct the common people concerning various diseases to which they are incident, seem to have been rather deficient concerning the treatment of metallic poisons. After the use of an emetic, they appear to lay the whole stress on copious dilution with milk, oil, or fat broths, which, though by no means improper, yet are too often found inadequate to the cure.

Milk, and oleaginous fluids, it must be observed, dissolve metallic salts with difficulty, and therefore are much inferior to tepid water, the common menstruum of all saline bodies, and the best diluent for washing them speedily out of the body. Oleaginous substances tend to mitigate the symptoms, it is true, partly by evacuating, and partly by inveloping the poison, but having no specific power, entirely fail of subduing the remainder, which often lurks in ambush amidst the various folds of the interior of the stomach or bowels, and there continues to exert its mischievous effects.

As the consequences of mineral poisons are so sudden, and the symptoms so extremely rapid, as frequently not to admit of calling in a physician, or even any other medical aid, I shall here attempt, in some sort, to supply the deficiency of those popular and truly respectable writers

---

* See the new edition of their Pharmacopœia, in the year 1788.

First Indication.—Whenever this, or any other metallic poison, has been inadvertently taken, the first indication is undoubtedly to expel it as speedily as possible by an emetic, of very quick, yet safe operation. For this purpose, twenty grains of *White Vitriol* may be dissolved in half a pint of warm water, and drank immediately, followed by very plentiful dilution with simple tepid water alone, till the whole of the poison is brought up, which may be known by an entire cessation of the symptoms.

With respect to the present poison, as a single grain of verdigris excites instant vomiting, it supercedes the necessity of other emetics, and this propensity may be increased as long as may be convenient, by mere dilution. But where an hour or more has elapsed before the accident is discovered, a portion of the poison has already entered the bowels, and cannot now be discharged by vomiting, but requires peculiar management; which brings me to the second indication.

Second Indication.—Which is, to correct the remaining poison by proper antidotes, if any such be known, or to discharge it downwards as speedily as possible. Fortunately this may be generally accomplished where the nature of the poison is previously known, and the remedy administered before the internal parts are irreparably injured. This applies indeed principally to the poisons of the metallic class, which are much better understood than those of the vegetable kind, and of course more easily decomposed by chemical agents.

Thus, if to a solution of verdigris, which is known to consist of copper combined with an acid, we present an alkali, or absorbent earth, we know, from the laws of chemical attraction, that the acid prefers either of these bodies to copper, and will therefore deposite the metal in form of an inactive calx, now destitute of the virulence it lately possessed from the acid. Therefore it may be very advisable, the moment this poison has been taken, to proceed as follows:—

In about six quarts of tepid water, dissolve half an ounce of any *alkaline* salt; as *salt of tartar, salt of wormwood,* or *pearl-ash*; or, if these be not at hand, a solution of near double the quantity of common *wood-ashes,* when strained through linen, may answer the end. Let a pint of this *alkaline ley* be drank every half hour, with a tea-spoonful of *calcined magnesia,* till the symptoms disappear. As a considerable part of the liquor will be rejected by vomiting, this copious dilution must be resolutely pursued, till nearly the whole is taken, and the poison entirely decomposed, and washed out of the body.

A pint of the alkaline ley may also be administered as an injection, especially if the pain should continue; and the magnesia must be repeated, till it has operated briskly, so as to cleanse the stomach and bowels very effectually. For while the smallest particle of the poison remains unsubdued, the patient is not safe.

The calcined magnesia here seems greatly preferable to most other purgatives, particularly those of the acrid kind, which would be also highly improper, on account of their heating quality.

1st. Because magnesia being perfectly mild and insipid, it sits easy on the stomach, while the others are constantly rejected.

2dly. It operates in so gentle a way, as to diminish the inflammatory disposition, which the others tend only to exasperate.

3dly. As an absorbent earth, it corrects the acrimony of metallic poisons, by decomposing them, and is perhaps the only cathartic that possesses this property.

After this treatment, should any relics of the poison remain, which however is not very probable, the *liver of sulphur*, accompanied by a milk and mucilaginous diet, will, it is presumed, seldom fail to complete the cure.

It may not be improper to observe that the above method is not confined to *verdigris* or poison of *copper*, but is equally applicable to other mineral poisons, as those of *lead*, *glass of antimony*, *corrosive sublimate*, *cobalt*, and perhaps *arsenic* itself. This last, however, is so refractory a substance, and so very intractable to almost every method of treatment, that (contrary to what is observable of other mineral poisons,) it retains a degree of virulence even after it is decomposed.—Is it not then a matter of serious concern, that this most formidable poison begins to be administered as a medicine, not only by men of science, but by illiterate dabblers in physic; not only as an external empirical application against cancers, but as internal specific against fevers? For of late it is (as we are informed) indiscriminately given even in common agues, wherein there certainly can be no just ground for having recourse to so doubtful, so dangerous, so desperate a remedy; especially when the Peruvian bark, and other safe, efficacious, and approved febrifuges, are constantly at hand.

To the Proprietors of the Belfast Magazine.

Having met with the following little Essay, I thought it might deserve a place in your useful publication. L.

A LATE publication, entitled, "The Miseries of Human Life," had so wonderfully extensive a sale, run through so many editions in so very short a time, and of course was so very profitable a work, (I mean to the author and bookseller,) that it is no wonder if I have been tempted to offer to the notice of the very liberal public, a few remarks on the same subject. And if the present paper be short, it has at least one recommendation, that it is the sooner read.

The miseries of human life are caused by the want of regulation of the human mind, and can only be prevented or cured by a close attention to the regulation of the human mind.

This is a simple maxim, which comprises all we can learn on the subject from any book, and yet this is the only defect which our author has overlooked.

For it is the mind alone which feels, and its sensations and perceptions owe their power of producing pleasure or pain entirely to the predisposition of the mind, or to their associations. It is not the act alone which affects us with these emotions, but the manner in which the mind receives the impression.

Nobody will, to prove this theory, thrust his hand into the fire, and try not to feel pain; but yet nobody will deny that the Roman patriot felt pleasure in this very act; or that martyrs, who with holy zeal voluntarily inflict, or cause to be inflicted on themselves the greatest torture, prove the most enthusiastic joy. And